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ABSTRACT

This study measured current trends in distance education in the United States within Library and Information Science programs. The study was conducted, for the period 1989 to 1998, through a content analysis of journal articles from the "Library Literature" database, and through a content analysis of graduate catalogs from American Library Association (ALA) accredited library schools. Of 128 journal articles analyzed, 86% were non-research articles, with the main topic of discussion being distance education at a specific library program. The remaining 14% of the articles were dedicated to research, with 44% of that research pertaining to the study of distance education students. A significant finding was that slightly more than half (56%) of the 128 articles were published in the three-year period 1996 through 1998, with the Internet being the technology category most cited. The analysis of graduate catalogs found a definite increase in the use of distance education. In 1989, 16.67% of accredited library programs used distance education. By 1998, the number of accredited programs using distance education had increased to 75%. In 1989, no school offered the entire Master of Library Science through distance education. By 1998, 18.75% of schools offered the degree in that manner. In 1989, the dominant delivery system for distance education was an audio/video-based technology, with no use of the Internet. By 1998, 22.22% of the 36 accredited library programs offering distance education were using only an Internet-based technology to delivery classes, and 50% of those 36 programs were using both the Internet and audio/video technologies in combination. Appendixes include a list of ALA accredited library programs and coding sheets. (Contains 28 references.) (AEF)

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DISTANCE EDUCATION IN LIBRARY AND INFORMATION SCIENCE EDUCATION: TRENDS AND ISSUES

A Master's Research Paper submitted to the
Kent State University School of Library Science
in partial fulfillment of the requirements
for the degree Master of Library Science

by

Diana Zepp

Fall 2000

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Master's Research Paper by

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CHAPTER 1

INTRODUCTION

BACKGROUND

Distance education is not new to academia and certainly not new to the Library and Information Science (LIS) field. Historically, distance education programs were developed to provide access to education for those students geographically isolated from colleges and universities. As early as 1888, Melvil Dewey, one of the founding fathers of library science, initiated the use of correspondence study for special library and small library services.[1] This type of distance education became very popular with those working within libraries and flourished over several areas of the United States. In contrast, however, correspondence study never enjoyed a positive reception among LIS educators, nor, was this method of instruction viewed favorably early in the twentieth century among the members of the American Library Association Committee on Library Training.[2] Even though correspondence education was historically resisted among LIS educators, from it has grown today's acceptance of technology-based distance education.

While correspondence study was the first initiative, it was not the only effort to provide alternative access to education in LIS programs. Often known as extension education, courses were held outside or beyond the physical confines of the university campus (off-campus) and were taught in the traditional face-to-face instructional mode.[3] Although extension education is considered outside the definition of distance education,

these efforts are worth noting. Daniel Barron, one of the pioneers in LIS distance education, considers extension education offered by LIS educators a major breakthrough. According to Barron, "they demonstrate an effort to accommodate and support the nontraditional learner…this is the first step in legitimatizing distance education."[4] Either from a sense of responsibility or, more than likely, economic survival, LIS educators needed to create opportunities for those not able to attend traditional classroom study.[5]

The literature reviewed for this study identifies the three most pervasive forces acting upon all institutions of higher learning that will influence their use of distance education in the future: economic issues such as institutional funding and the student's ability to pay for an education; a rapidly changing student population (age, full or part-time, geographic or temporal isolation); and continuous change in technological innovation and capabilities.

In the six decades since library schools moved out of libraries and into universities, universities have become vastly more expensive to run. Costs have risen steadily, but income has not kept pace with those costs. In the 1970s universities were feeling the pinch. By the 1980s budget deficits led to sharp drops in both state and federal funding to academic institutions.[6] The financial pressure felt by higher education led to an acceptance of the business management model among university administrators. Faculty and schools had to prove their programs were productive and profitable in terms of management values.[7] Pressure to change missions and priorities, to adapt to social, political and economic demands, incorporate technological advances, and function in a world of shrinking resources were factors related to the closing or restructuring of library schools.[8] According to Saracevic, research universities that closed their library schools argued that, "there is no place for library schools in their plans for change, particularly considering current restrictions

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on resources" and "education for information professionals...can be better accomplished under differing academic roofs."[9]

Within the past decade, distance education in the United States has expanded to address temporal as well as geographical solutions. The changing social fabric, with its increasing demands on individuals—jobs, children, and commutes—has made "time" a highly valued commodity in our society. Current data presents an evolving student body that will become older, involved in part-time rather than full-time instruction, less able to go to the typical campus, and more selective in exercising their educational options than any student population in the past.[10] In 1992, statistics summarized by John Elson reported that only 20% of the nation's undergraduates, between the ages 18 and 25, had their education financed by their parents.[11] He also noted that 40% of all students nationally are part-time and predicted that this percentage will increase dramatically by the year 2000.[12] Other research predicted that the number of students, age 35 and older, would increase 26% by the year 2000.[13] In the area of library science, figures show that 65% of all enrollments in accredited library science programs are now part-time students.[14]

Judith Roberts summarized several statistical studies pertinent to distance education. The findings, from a Canadian study concerning adult learners using distance education, were that six out of ten distance learners were male, older than their female counterparts and had employment incomes twice as large.[15] The majority of these distance learners were between the ages of 25 to 44 years of age. They also lived in urban areas, and were employed in either sales, the service industries, or in blue-collar jobs.[16] Roberts also noted that the Canadian study challenges data from earlier research. The earlier research studies, also cited in her article, indicated that most distance learners lived in regions with no

university access and that more women than men tended to be distance learners who were in their early to mid-thirties.[17]

Emerging technologies provide extraordinary opportunities to enhance distance education to the broadest possible audience of learners. One of the most obvious facts of distance education is that it is dependent upon technology. Some medium of communication must be employed to bridge the distance between teacher and student. The previous efforts of the 1960s, 1970s, and 1980s employed a broadcast mode of delivery using live satellite broadcasts, television, video and/or audio teleconferencing. With the current explosion of electronic technologies, and the connectivity of the Internet and World Wide Web for information distribution, communication delivery is being transformed from a broadcast mode to an interactive mode. Interactive capabilities in instruction significantly enhance and expand learning opportunities for students. Integrated sound, motion, image, and text create a rich new learning environment with clear potential to increase student involvement in the learning process.[18]

A misconception concerning distance education is that it is inherently inferior to face-to-face instruction. But in fact there is a preponderance of research indicating that well-designed distance education programs produce learning outcomes equitable to and in specific applications superior to the face-to-face model.[19]

Supporters of distance education believe it is the wave of the future, that technology promises high-quality education with wide access and low costs, and that it could be the one initiative that would attract the new audience of adult learners in the twenty-first century. Supporters also believe that distance education should not be seen as the universal panacea

for all the problems in higher education, but that distance education should be employed as a tool to improve the quality of learning.

Skeptics, however, raise many questions regarding distance education's advantages, success, and efficacy as a viable form of providing education. Student motivation, financing, implementing technology, and the radical change in the relationship between student and instructor are concerns repeatedly expressed by the skeptical literature.

PURPOSE OF THE STUDY

The purpose of this study is to determine trends in distance education within the LIS field and the usage of distance education in ALA accredited library programs within the United States for a ten-year period.

This study proposes four objectives.

Two objectives deal with an analysis of professional journals: to identify the quantity of research being published and the subject of that research; and, to identify the major topics of concern the library science field has with distance education.

Two objectives deal with an analysis of university catalogs: to determine whether LIS programs have implemented or increased their usage of distance education; and, to identify and quantify the technology being used for delivery of distance education.

LIMITATIONS OF THE STUDY

The study is limited to the use of distance education in LIS programs within the United States. Therefore, the findings cannot be generalized to non-LIS programs or to programs outside the United States.

DEFINITION OF TERMS

Based on the review of articles for this study there does not appear to be a precise definition of the term "distance education." For the purpose of this study, the definition from the Thesaurus of ERIC Descriptors was used for distance education.

Distance education is defined as education via the communications media (radio, television, computer-mediated communications and other technology) with little or no classroom or other face-to-face contact between students and teachers.[20]

Extension education is an educational effort that takes instruction physically beyond the confines of the traditional campus. It is characterized by faculty traveling to a distance site to deliver instruction face-to-face.

Delivery system is a type of technology used to delivery instruction to a remote site, such as the use of video conferencing.

CHAPTER 2

LITERATURE REVIEW

The research on distance education, which covers a range of educational disciplines, programs and institutions, reveals a comprehensive treatment of needs, problems and concerns of the distance students; technology utilization; faculty opinions and attitudes regarding teaching methodologies; and financing distance education programs. A review of the following articles summarizes distance education research pertaining to the library science field.

University Offerings

Distance education within the United States evolved out of the philosophical belief that higher education is a fundamental right and must be made accessible to all. [21] Early distance education programs were developed to serve rural learners disadvantaged by geography. Studies by Mary Lenox and Daniel Barron focus on ALA accredited programs offering off-campus and distance courses to those students geographically dispersed.

In 1990, Mary Lenox[22] conducted a survey of sixty ALA accredited programs concerning off-campus and distance courses. The survey reported that twenty-six of the fortey-two respondents indicated that they provided off-campus courses. The survey noted that regular faculty at remote locations taught these off-campus courses.

Daniel Barron[23] studied the development of technology used in LIS distance education. The author reviewed data from the *ALISE Library and Statistical Report* from

1980 to 1996. Barron noted that 795 courses were offered off campus from ALA accredited programs in 1996. This figure, compared with the 223 courses offered in 1980, shows a six percent increase of off-campus courses per year for a sixteen-year period. His analysis also documented an increase of distance education. In 1980 no schools offered distance education via telecommunication technology. One school in 1984 offered one course using telecommunication technology. Five schools in 1986 reported using telecommunications. By 1992, ten schools were using telecommunications to deliver distance courses. In the 1996 report, seventeen schools reported using telecommunications to deliver courses with a number of schools exploiting the use of the Internet, web-sites, electronic mail and computer conferencing on a regular basis.

Characteristics

Information about the scope of students participating in distance programs helps educators design appropriate instructional methods, provide better support and address barriers to enrollment. Case studies by Gayle Douglas and Daniel Roland provide some insight to characteristics and graduation rates of the distance learner within LIS programs.

In 1992, Gayle Douglas[24] reported on a three-year study of distance education students enrolled at the University of South Carolina. The author describes a case study comparing the performances of the distance students with that of their on-campus counterparts. The study consisted of 187 students who were separated into four classifications:

- Thirty-Eight on-campus students at Columbia considered the control group.

- Fourteen South Carolina distance learners who completed 50% or more of their degree through telecommunications or at sites away from the Columbia campus.
- Ninety West Virginia distance learners.
- Forty-five Georgia distance learners.

Attrition, retention, and graduation rates were tracked during the five-year MLIS degree cycle. High rates of withdrawal during the first year were found on the USC home campus and among West Virginia students. West Virginia withdrawals were attributed to economic factors. The loss of 18% of the Columbia campus was still being investigated. Of the students that graduated, 72% from West Virginia had completed the MLIS in a three-year period, 76% of the students in Georgia completed the program in three years, and 61% of Columbia Campus completed the program in three years. Students progressing toward an MLIS include 16% of the Columbia Campus, 36% of South Carolina distance learners, 5% of West Virginia students and 7% of Georgia students. There were no significant differences in grade point average between the distance students and the on-campus students. The following differences were found among student characteristics. Distance learners in all three states were six to ten years older than their Columbia campus counterparts. Those in West Virginia and Georgia averaged twice the number of years of library experience. Of those students that earned a previous master's degree, over 83% were from West Virginia and Georgia. The author concluded from the findings that the high graduation rates proved South Carolina's distance education program a success. A follow-up survey showed a high percentage of distance learners, previously employed in libraries and other information agencies, received promotions and salary increase after graduation.

In 1997, Daniel Roland[25] compared the characteristics of distance students at the Nebraska School of Library and Information Management (SLIM) program. The 1991 cohort (Nebraska I) was compared to the 1997 cohort (Nebraska II). The findings characterized the second group (Nebraska II) as younger than the first. Sixty percent of the Nebraska II students were forty years of age or younger, compared to 53% of the Nebraska I students who were over forty-one years of age. Fifty-five percent of the Nebraska II students were in school within five years of starting the MLS program and they were also commuting farther to attend classes. Sixty-nine percent were driving fifty-five miles one-way to attend class, and 36% drive over one hundred miles or more. Seventy-five percent of the Nebraska II students were working full-time in the library profession. Seventy-two percent had an annual family income of less than $50,000 and 48% of that number made less than $35,000. Roland's study also listed factors discouraging enrollment in the Nebraska distance education program. Two factors that were cited as most significant for non-application were cost of tuition (87%) and the distance required traveling to classes (56%). Other major factors cited were: out of pocket expenses (meals, rooms, etc.); loss of weekend time (mainly because of children being at home); need for a computer and Internet access; and the time it would take to finish the degree. Roland concludes that tuition reimbursement and financial support would aid in removing the barriers to many potential students, as would having assistance in the form of a program for purchasing computer hardware and software necessary for the program.

Needs Assesment

The unique characteristic of distance education is that it involves geographic or temporal isolation from the main learning institution. An issue for both distance students and learning institutions offering distance education is the extension of support and services to off-campus students. Articles by Ann Jones, Marie Kascus, and Alexander Slade present research on the accessibility of off-campus support and services to distance students.

As Roland found in his study, a barrier to enrolling in a distance education program is access to the Internet and cost of computers. In 1990, Ann Jones[26] reported on a three-year evaluation of the home computing policy offered by the Open University. This policy was created to increase students' access to computers. Access was divided into four elements: the decision of the student to rent, buy or make other arrangements; type of equipment bought or rented; faults in the equipment and how they were dealt with; and ease of setting up the equipment. The report found the pattern of access, type of equipment and so on differed for men and women. The data indicated that women are more likely to rent and to need financial help than men; they are less likely to have access at work; and tend to have less powerful computer equipment. The same pattern is true for novices. Other problems highlighted in the report were the quality of services provided by the rental firm; the slowness in dealing with problems; the lack of local and regional help; and the cost. Most of the students that purchased a computer thought the financial investment worth it. Those students who rented their equipment felt the rental costs were too high, or too high given the amount of use made of the equipment. Most students surveyed had little problems setting up the equipment. Given the outcomes of the evaluation, the university decided to provide rental services to those students at a disadvantage (namely women and students with no computer expertise).

Anne Jones concludes her report by stating that the issue facing the increase of home computer courses will be the balancing of demand for rental machines and the associated costs involved.

In 1991, Marie Kascus[27] conducted a survey to all LIS ALA-accredited schools in the United States and Canada to determine the prevalence of and attitude toward coursework on the topic of library service to students in off-campus and distance education programs. The results of the survey indicated that no library school responding has a dedicated course on the topic of off-campus library support; no library school responding offered continuing education workshops or seminars on the topic; and 66% of the deans and directors responding did not see a need to expand curriculum to include a dedicated course on the topic. Seventy-nine percent of respondents indicated that the topic was discussed in one or more courses in the curriculum. The most frequently identified course in which off-campus issues are discussed is that dealing with academic libraries. When asked about modifying existing courses to include the topic of library service at a distance, 43% of the schools responded favorably.

The survey also indicated obstacles to expanding the curriculum in the area of off-campus services. Thirty-four percent of the deans and directors responding indicated not enough time and too much material to cover as the major obstacle. Other obstacles included money; lack of interest; not in goals and objectives; and lack of faculty resources. The author concludes that the overall attitude toward library support to distance students as a library education issue is that of ambivalence. The author also concluded that a topic for further study should be the lack of research in the area of library support and services to distance students.

In 1991, Alexander Slade[28] discussed a comprehensive study on the status of off-campus support in Canada during the late 1980s. The study provided a descriptive account of off-campus library services at thirty-five universities and thirty-nine colleges in Canada. Results of the survey indicated that over 80% of the universities and over 70% of the colleges provided support to off-campus students by supplying specific library items, answering reference questions and conducting subject searches for those students. In addition, over 80% of the universities and over 60% of the colleges provided their core collection for off-campus courses.

The categories in Slade's study that showed the lowest support dealt with planning and administration of off-campus library services. Less than 50% of universities and less than 30% of colleges indicated that the library conducts needs assessments, has separate funding procedures, and is involved in curriculum development for off-campus courses.

In summary, Slade indicated that library outreach services and core collection services are the two primary measures of off-campus library support in Canada. Eighty-eight percent of the universities and colleges combined provide one or both of these services. Slade found that many Canadian institutions tend to provide off-campus library support on an ad hoc basis (that is there is little prior planning). In general, the majority of institutions responding to the survey take seriously the issue of library support and services to off-campus and distance students. The degree to which these institutions actively serve this body of students varies. The survey identifies the existence of variations but not the reasons behind them. The author recommends further investigation and research in this area.

Faculty Perceptions

Faculties are critical to the success of any distance education program. Research by Daniel Barron and Anita Coleman discuss the importance of the faculty component in a distance-learning endeavor.

Daniel Barron completed two studies addressing pertinent issues on barriers to distance education and faculty attitudes toward off-campus students. In 1987 Barron[29] conducted a survey of ALA-accredited program faculty and administrators to determine barriers to the use of technology for distance education. The data showed that few programs use technology for distance education and that funding, lack of courseware, inadequate faculty skills, inadequate rewards and incentives for faculty were the major barriers to the use of technology in these programs.

Another study by Daniel Barron[30] addressed faculty attitudes toward off-campus students. Most off-campus students are normally part-time and frequently library professionals seeking the degree for job security. Barron surveyed 685 faculty and administrators in ALA accredited programs in regard to their perceptions of off-campus students. Of the 685 individuals queried, 384 responded. The data showed 27% of the respondents were teaching off-campus courses. The study found little differences in teaching between off-campus part-time students and full-time students on the main campus. The majority of respondents agreed on two issues concerning off-campus students: that off-campus students were difficult to reach outside the class and they were difficult to integrate socially within the program.

Expanding on Barron's research, Anita Coleman[31] conducted a survey in 1995 of faculty who were teaching distance education classes at library schools. The results of her

study showed a 70% return rate for the survey. She found that a total of thirty3 full-time faculty at LIS schools are involved in distance learning. This is five percent of a total of 700 full-time LIS faculty teaching in the United States, at the time of the survey. Ninety-two percent of the respondents stated that their courses were suited to distance learning, irrespective of the technology used for such education. Seventy-five percent reported they spent more time preparing for a distance-learning class than a regular class. Ninety-five percent reported their involvement in distance learning resulted in improved teaching in the traditional classroom. Twenty-three percent of respondents cited technical breakdowns as a major disadvantage of distance education. A lack of familiarity with the delivery technology was revealed by 34% of the respondents, indicating a need for training and literacy of telecommunication technology. Other findings involve conflict of time, the faculty role in the classroom and copyright issues. The study revealed faculty have found it difficult to do quality teaching, research, and public service activities in the distance-learning model. It was reported that research is often the first to be neglected. The respondents in the study stressed how their role changes in the distance model. Traditionally the faculty was the teacher and in control of the learning. In the electronic classroom, teaching becomes a performance. Many respondents articulated the power of presentation skills and acting techniques are needed to keep the audience interested and learning.

Copyright issues were reported to be a murky area. Respondents indicated there are no clear guidelines about ownership, first-time use, reuse, and archiving taped materials, (broadcasting copies of copyrighted materials without permission violates existing copyright laws).

The author concluded that faculty are a critical factor in the success of a distance learning program. The author suggests an establishment of a clearinghouse for course materials that may ease time conflicts and copyright problems. The author also identifies three issues to be considered if distance learning is to have an impact upon teaching and learning behavior. First, technology needs to be appropriate to the class and the necessary training provided. Second, most educational institutions identify access to be the primary goal of distance education, while she maintains that the focus should be on the type of learning outcome that distance education can facilitate. Third, beliefs about traditional education need to change, not so much for the students and faculty involved in distance education, but for university administration, accrediting agencies, and future employers.

Technology and Learning Outcomes

The following studies examine the impact of technology on learning outcomes, cognitive thinking, student attitudes and perceptions.

In 1995, D. R. Newman, Chris Johnson, and Brian Webb[32] evaluated critical thinking in group learning situations. They evaluated student questionnaires and a content analysis of test scores between face-to-face seminars with asynchronous computer conferencing. Their goal was to measure the amount of critical thinking on different media and to find which critical thinking activities are encouraged or hindered by a particular technology. The results of their research found similar amounts of critical thinking in both face-to-face seminars and computer conferences. The content analysis showed that the overall depth of critical thinking was higher when learning took place on the computer conferencing system, a four- percent difference. The results of their findings suggest that face-to-face seminars were better for

creative problem exploration and idea generation, while the computer conferencing environment better supported linking ideas, interpretation and problem integration.

In 1990, Donna Gee[33] conducted a study of students' learning styles, academic achievement and course completion between distance students and on campus students. The study procedures included a questionnaire to gather demographic information; a pretest to measure students' knowledge before instruction; a posttest used to measure the degree of knowledge after instruction; and the Canfield Learning Styles Inventory (CLSI). The CLSI identifies students' primary learning styles which include the following categories: 1) social, 2) independent, 3) applied, 4) conceptual, 5) neutral, 6) social/applied, 7) social/conceptual, 8) independent/applied, 9) independent/conceptual. The results of the study found no statistical differences in knowledge of course content score measured by the posttest between on-campus students and distance students. There was no statistical difference in attitudes toward learning experience between students on-campus and distance students. There was a 100% course completion rate for both sets of students. Differences were found among learning styles, as follow. On-campus students identified in the social/applied learning style group had the highest mean posttest score, while students in the conceptual learning style group scored lowest. Students in the distance classroom identified in the independent/conceptual learning style group had the highest posttest mean score, whereas students in the social/conceptual learning style group had the lowest. In conclusion, Gee suggests that learning style preferences may affect academic achievement and attitude of students involved in distance education settings. She also stresses the need for further research in the area of instructional methods that would incorporate different learning style

preferences. Students' attitudes and learning style preferences are variables most likely to impact student's success in distance education programs.

Dietmar Wofram[34] studied the attitudes and perceptions of students toward the use of audiographic technology as a teaching and learning tool. A survey of questionnaires was compared between local on-campus students and distance students. Attitudes toward the technology in general by both sets of students varied little. All students felt comfortable using the equipment. Students at the remote cite expressed frustration with static in the telephone lines and felt left out because of this problem. Both local and distance students expressed frustration with the time it took for the transmission of graphics.

The greatest differences between local and distance students were found in their perceptions of audiographics as an effective teaching and learning tool. All the distance students expressed that the technology enhanced their learning and had a very positive attitude toward the technology. None felt the lack of face-to-face contact with the instructor was an obstacle. None of the distance students felt inhibited to ask questions. Local on-campus students' attitudes varied widely, and were overall less positive. The local students believed they were denied opportunities offered in the standard classroom environment because of the presence and use of the technology. They felt the technology became a barrier to the kind of interaction or visibility available in a standard classroom. Overall, the author concludes that the technology worked well for the particular course taught. Both local and distance students appreciated the ability to interact with the technology that related directly to the course. Wolfram encourages further study of the technology in an array of classroom settings.

Research by Kathleen Haynes, Connie Dillion, and Serena Stanford identified issues relating to the impact of technology on the distance learner.

In a 1992 report, Kathleen Haynes and Connie Dillion[35] examined the use of telecommunication media upon learning outcomes designed by learning level and instructional strategy. Success indicators were compared between students at the main University of Oklahoma campus at Norman, and the students at the distance site in Tulsa. The distance site at Tulsa followed class via compressed video and voice interaction with the main campus. The comparison used content analysis of written exams, observations, interviews, and analysis of student interaction and examination of students' attitudes using a questionnaire. The study found there were no differences between the two groups in learning, but significant differences in classroom interaction and student attitudes. Students at the distance site interacted much less with the instructor and more between themselves. The problems addressed by the distance students in the study were related to the technology rather than the course. The survey found problems with the audio subsystem; availability of resources, such as software, hardware, and printed tools; inadequate access to electronic systems; and faculty advisement. Currently the technology used in telecommunication systems targets the home campus or sending site, and largely ignores the distance or receiving site. The research by Haynes and Dillon suggests a refocus of electronic resources to the receiving or distance site, as well as student support groups and training for distance facilitators.

Serena Stanford followed the research by Haynes and Dillon, and continued the inquiry of technology's impact on the distance learner. In 1997, Serena Stanford[36] evaluated new ATM (asynchronous transfer mode) technology at San Jose State University (on-

campus) and California State University at Fullerton (distance site). ATM technology is the use of live two-way interactive video and audio technologies. Questionnaires were used as the comparing instrument. The results of Stanfords's study showed no significant differences in the learning outcomes between on-campus students and distance students, attitudes toward site set-up, or sense of community. Her study concluded with the concerns that distance students had with the following issues: instructor's skill in managing the distance system; the perception that instructors favor those students at the originating site; class discussion is difficult in the distance mode; and face-to-face advising with instructors would be helpful.

In the area of technology, MaryEllen Sievert et al[37] evaluated various distance education formats in 1997. One course in *Libraries, Medical Informatics and Health Care* was offered using three different modalities for the delivery of instruction—satellite broadcast, Internet-based delivery, and face-to-face instruction. It was found that the satellite broadcast had the most participants, with over 400 participants viewing the broadcast from forty-one states, Guam, Canada, Australia, India and Israel. The average rankings on the evaluation ranged from 5.7 to 6.7, where the highest was 7. Comments were positive and enthusiastic. The Internet course had over fifty participants. This form of delivery was not seen as being as positive as the satellite broadcast. The ratings on the evaluation questionnaire ranged from 4.2 to 6.7. Comments reflected problems with technology and frustration with working in isolation. The face-to-face mode of delivery attracted seventeen participants, mainly from Missouri. The ratings on the evaluation questionnaire ranged from 6.1 to 7. Comments were positive and mostly enthusiastic. The authors concluded that the lower ratings for the Internet course reflect the inexperience of both students and instructors

with this medium. The positive ratings for the other two forms of delivery, broadcast and face-to-face, were found to be due to teaching and speaking skills of the instructors.

In 1996, Marita Peterson Holland[38] reported on collaborative technologies used in a distance education class between two universities, the University of Michigan (on-site) and the University of Illinois at Urbana-Champaign (distance site). Throughout the course students were evaluated on their level of engagement and satisfaction with newly introduced technologies. The distance students were rated as having higher levels of engagement compared to their on-site counterparts. Possible reasons for these higher levels were due to stationary microphones in front of the distance students' seat (students were more easily heard when speaking in a normal tone of voice) and that the distance site had more monitors visible to the students. In the on-site classroom the students had to speak loudly and pass a microphone among classmates, and had only one monitor to view the remote site. Satisfaction levels were reversed when group work was evaluated. The on-site group rated their experience with working with the distance group more positively than the distance students. This may be due to more technical support staff available to the on-site group. The author concluded the evaluation by stating that the students overall were positive about their use of various technologies, with the exception of a Web-based conferencing tool called HyperNews. The majority of students found HyperNews difficult to use, but also indicated that they would take another inter-university class if offered.

CHAPTER 3

METHODOLOGY

As stated in Chapter 1, the purpose of this study is to determine the trends and usage of distance education in the United States within the library science field for a ten-year period. To that end, two content analyses were conducted: an analysis of articles from the professional literature retrieved from the *Library Literature* database for the period 1989 – 1998 (Chapter 4, Part 1), and an analysis of catalogs from universities having ALA accredited programs, for the year 1989 and the year 1998 (Chapter 4, Part 2).

The content categories used in this study were generated during the review of the data sources. After the general content categories had been identified, subcategories were added to reach a higher level of specificity.

Conventional content analysis looks at words and phrases in an effort to identify and extract significant meanings. The approach in this study uses complete journal articles. According to Weber, "There is no simple right way to do content analysis. Instead, investigators must judge what methods are most appropriate for their substantive problems."[40] He warns that large portions of text, like complete journal articles, are difficult to code and more likely to be susceptible to coder bias.[41] Weber's caution must be applied to this study.

Data collected from the professional literature journals was entered on coding sheets. Articles were categorized as being either research or non-research articles, then further divided into sub-categories such as author affiliation (faculty, librarian, staff editor, etc),

topic, publication year, and so on (see Coding Sheet A, Appendix B). The data recorded on the coding sheets was statistically analyzed by using the SAS (Statistical Analysis System) program through Kentvm. Simple frequency counts were used to generate the percentages used to identify the major issues concerning distance education, the type of research being performed, and the type of technology used.

Data collected from the university catalogs (see List of Accredited Library Programs, Appendix A) was entered on coding sheets, with the two primary categories being 1) distance education offered by library science program, and 2) type of electronic technology used in distance education program. These two categories were further divided into sub-categories (see Coding Sheet B, Appendix C). The data from the coding sheets were statistically analyzed by using the SAS program through Kentvm. Simple frequency counts were generated to compare the 1989 to the 1998 catalogs, in order to identify any increase in the use of distance education in LIS programs over the ten-year period, and to identify trends in the technology used in distance education delivery.

CHAPTER 4

ANALYSIS OF DATA

Part 1 of this chapter is an analysis of articles from the professional literature retrieved from the *Library Literature* database for the period 1989 – 1998. Part 2 of this chapter is an analysis of catalogs from universities having ALA accredited library programs, for the year 1989 and the year 1998.

PART 1: ANALYSIS OF PUBLISHED ARTICLES

The *Library Literature* database was searched for the subject heading "distance education" for the years 1989 to 1998. The sources of analysis were limited to those articles from journals within Kent State University holdings. Excluded from the study were conference proceedings, articles written outside the United States and articles that were less than a page in length. Applying these limitations resulted in 128 articles used in the study. Results from the content analysis of the selected journal articles follow.

Article Type

The journals used in this study were coded into two categories: research or non-research. The number of research articles (14%) was significantly lower than non-research articles (86%). These results may suggest that research on distance education in library schools is not important to scholarly works, that research is being conducted but not

published in the major library journals, or that there are few distance education programs offered at ALA accredited library programs.

Author Affiliation

Coding sheets noted six author types: *Faculty*, *Librarians*, *Graduate students*, *Media/Communications*, *Staff editor*, and *Other*. The tabulations were performed from the 128 articles. Findings reveal that 52% of the articles were written by *Faculty* of a university, 22% of the articles were written by *Librarians*, 15% were authored by a *Staff editor* or writer of a journal, 6% of the articles were written by *Media/Communications* personnel, 3% of the authors were *Graduate students* and 2% of the authors were unknown and placed into the category of *Other* (see Table 1).

Table 1. – Author affiliate, ranked highest to lowest
(N=128)

Author Affiliate	*f*	*%*
Faculty	67	52
Librarians	28	22
Staff editor	20	15
Media/Communications	7	6
Graduate students	4	3
Other	2	2
Total	128	100

With the exception of one article authored by a Ph.D. graduate student, faculty authored all research articles (see Table 2). The majority of the research articles indicated

Survey as the most widely used research methodology (see Table 3).

Table 2. – Author affiliate for research articles, ranked highest to lowest (N=18)

Author Affiliate	*f*	%
Faculty	17	94
Librarians	0	0
Staff editor	0	0
Media/Communications	0	0
Graduate students	1	6
Other	0	0
Total	18	100

Table 3. – Research methodologies, ranked highest to lowest (N=18)

Methodology	*f*	%
Survey/questionnaire	11	61
Evaluation	3	17
Case study	2	11
Content analysis	1	5.5
Experimental	1	5.5
Interview	0	0
Bibliometrics	0	0
Delphi	0	0
Historic	0	0
Observation	0	0
Operations	0	0
Total	18	100

Publication Year

As stated previously, articles from this study were coded within a ten-year time period beginning in 1989 and ending in 1998. Articles published before 1996 showed the lowest percentages (see Figure 1). Over half (57%) of all articles were published between 1996 and 1998. The greatest number of articles (28%) were published in 1996. Figure 1 shows the percentage for each time period.

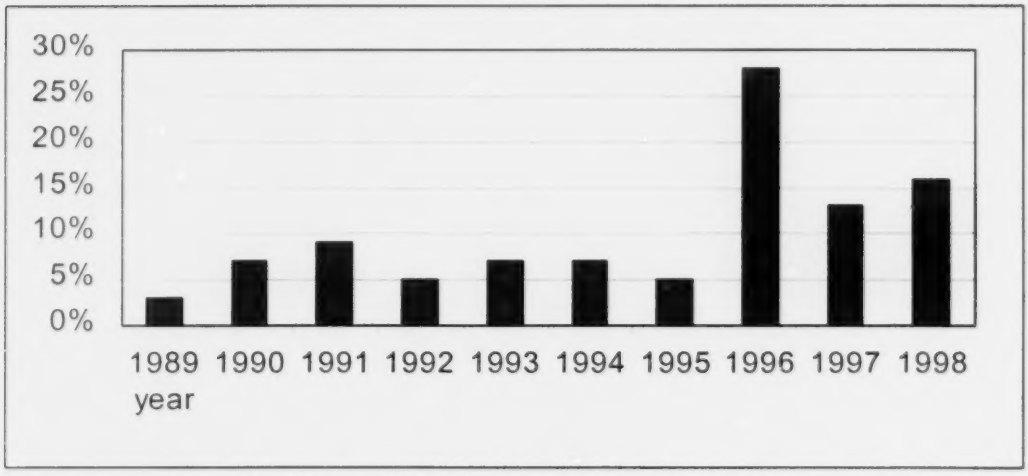

Fig. 1. Percentage of articles published each year from 1989 to 1998. (N=128)

Subject Categories

Subject categories were developed in an attempt to show the topics and issues concerning distance education that are apparently being emphasized within the library

science field. These categories emerged from the analysis. For the research articles five categories were used, and for the non-research articles six categories were used. Under each category sub-divisions were developed to obtain a higher level of specificity (see Coding Sheet A, Appendix B).

For research articles, *Distance education students* were the most frequently documented subject category (44%). This category includes research on learning performances, needs assessment, and students' attitudes and perceptions toward distance education. The second most researched category was *Distance education technology* (23%). This area of research includes the evaluation of delivery systems, support services technology and technology usage. Other topics researched in order of frequency were *Faculty*, *Distance education programs* and *Library resources and services* to distance education students (see Table 4).

Table 4. - Distribution of research categories, ranked highest to lowest (N=18)

Research Categories	*f*	%
Distance education students	8	44
Distance education technology	4	23
Faculty	2	11
Distance education programs	2	11
Library resources & services	2	11
Total	18	100

For non-research articles, *Distance education programs* were the most frequent subject category documented. Twenty-seven percent were coded into this category. The articles under this category discussed distance education programs at a specific library school and not distance education in general. The following are subdivisions and are included in this category: course offerings; the development and implementation of a distance education program; and the description, overview and issues of a distance program. *Technological development* was the second most discussed topic (20%). This category embodies the technology for instructional delivery and support systems. Other topics discussed by order of frequency were *Support services*, the *Field* (history, definitions and distance education in general), *Learning and teaching methodology*, and *Staff development* (see Table 5).

Table 5. – Distribution of non-research categories, ranked highest to lowest (N=110)

Non-Research Categories	*f*	*%*
Distance education programs	30	27
Technological development	22	20
Support services	20	18
Field of distance education	19	17
Learning & teaching methodologies	13	12
Staff development	6	6
Total	110	100

Technology For Delivery Systems

While numerous articles contained references to a variety of technology issues, only those technologies pertaining to distance education were included in this study.

The technologies used for the delivery of classes were divided into three categories. They are:

1) *Internet* and other computer-based technologies including computer conferencing and computer networking and the use of the World Wide Web (WWW).
2) *Audio/video* technologies which include audio/video conferencing, compressed video, interactive video, one-way audio, two-way audio, one-way video/two-way audio, interactive two-way audio/video and audio/video tapes.
3) *Broadcast* technologies including cable television, satellite broadcasts, television courses, interactive television and closed circuit television.

Table 6 shows that 56% of the total 128 articles used in the study discussed technology. Of those articles that discussed technology, 78% mention the use of the Internet. Table 7 shows the frequency and percentage of distance education technologies cited in the journal articles. Some articles were coded with multiple entries and the percentages do not equal 100%.

Table 6. – Articles citing technology, ranked highest to lowest
(N=128)

Articles citing technology	*f*	%
Technology mentioned	72	56%
No technology mentioned	56	44%
Total	128	100%

Table 7. – Technology categories that were cited, ranked highest to lowest
(N=72)

Technology Categories	*f**	%*
Internet +other computer based technology	63	78%
Audio/Video	38	53%
Broadcast	24	33%

* Does not add up to 100% because of multiple entries.

Technology By Year

In an attempt to discover any emerging trends, three categories of technology (*Internet*, *Audio/Video* and *Broadcast*) were coded into time periods based on the article's year of publication.

As shown in Figure 2, the year 1996 saw a significant increase in the discussion of technology. The *Internet* was the most discussed technology from 1996 through 1998. By 1998, discussion of all other technologies radically declines.

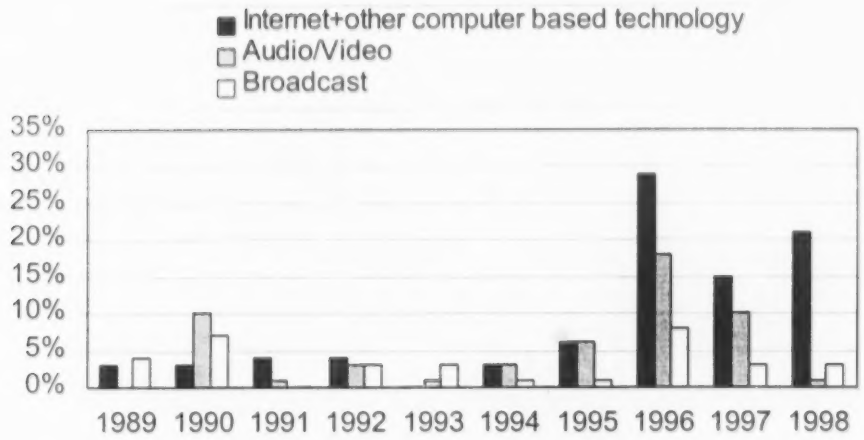

Fig. 2. Technology categories distributed by the year of publication.*
(N=72)

* Percentages do not add up to 100% because of multiple entries.

PART 2: ANALYSIS OF CATALOGS

University catalogs for 1989 were compared to catalogs for 1998 to determine if library schools (ALA accredited) either implemented or increased distance education technologies over the ten-year period.

The findings showed that in 1989 there were 53 accredited library school programs. By 1998 that number decreased to 48. Some library school programs were closed because of funding constraints. Others were incorporated into another discipline and no longer had need for accreditation. The 48 schools that retained their accreditation from 1989 to 1998 were used in this study (see Appendix A for list of schools).

The definition of distance education encompasses the use of technology to deliver instruction. To track changes or increased uses of distance education technologies, extension classes were also documented to use as a comparison.

Library Programs Using Distance Education

The data from coding sheet B revealed that in 1989, 24 (50%) schools offered extension classes only and 8(16.67%) schools offered classes through distance education. By 1998, 36 (75%) library programs offered classes through distance education, while 7 (14.58%) library programs continued to offer extension classes only (see Table 8 and Figure 3).

Of the 48 schools studied, 11 (22.91%) schools that did not offer distance education in 1989 implemented a program by 1998. Six (55%) of the 11 schools implemented a technology-only program (no extension classes were offered.). Five (45%) of the 11 schools offered both traditional off-campus extension classes and distance education.

Of the 48 schools studied, there were 4 (8.33%) schools that did not offer distance education in 1989, and these same schools did not offer distance education in 1998.

Table 8. – Percentage of ALA accredited library programs using distance education (N=48)

	1989 Catalog		1998 Catalog		% increase or decrease
	f	%	*f*	%	
No distance education or extension classes	16	33.33	5	10.42	-68.75
Extension classes only	24	50.00	7	14.58	-70.83
Distance education	8	16.67	36	75.00	+350
Total Accredited Programs	48	100	48	100	

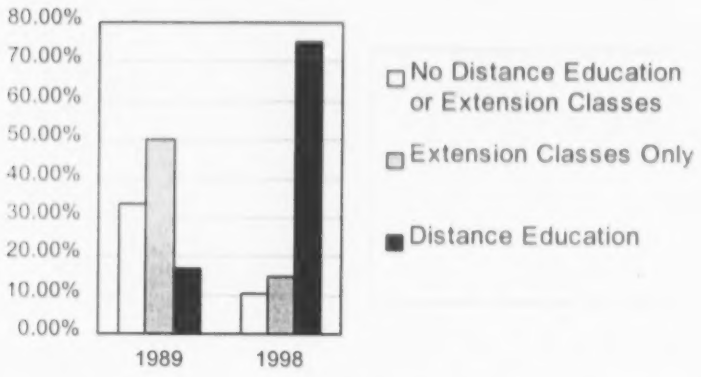

Fig. 3. Percentage of programs using distance education, 1989 compared to 1998 (N=48)

Distance Education Classes

To quantify any increased use of distance education within LIS programs, the number of classes were coded for each library school program. Some programs used both extension

classes and the use of distance education technologies. Both types of off-campus classes were coded.

As can be seen in Table 9, there was a definite increase from 1989 to 1998 in the number of classes being offered using distance education. By 1998, 9 (18.75%) schools offered the entire MLS program through distance education. Fifteen (31.25%) schools offered five or more classes per academic year and 12 (25%) schools offered four or less per academic year. Half (50%) of the LIS programs in the United States offered five or more classes per academic year through distance education. Theoretically, five classes per academic year can be enough to complete a MLS degree (although, again, only nine schools actually allowed a degree to be awarded through distance education).

Table 9. Number of distance education classes offered by ALA accredited library programs in the United States
(N=48)

Number of classes offered through distance education	**1989 Catalog**		**1998 Catalog**	
	f	%	*f*	%
Entire MLS program using distance education	0	0	9	18.75
5 or more classes per year	1	2.08	15	31.25
1-4 classes per year	7	14.58	12	25.00
No distance education classes	40	83.34	12	25.00
Total	48	100	48	100

The data from Table 10 shows a slight increase in the number of extension classes offered. In 1989 a total of 30 (62.5%) programs offered extension classes. By 1998 that

number increased by one class (31 or 64.58%). What is important in the figures seen in Table 10 is the number of LIS schools offering an entire MLS degree program through extension classes. In 1989, there was only one (2.08%) school that offered an entire program, but by 1998 that number increased to 12 (25%) schools.

Table 10. – Number of extension classes offered by ALA accredited library programs in the United States
(N=48)

Number of extension classes offered	**1989 Catalog**		**1998 Catalog**	
	f	%	*f*	%
Entire MLS program through extension-classes	1	2.08	12	25.00
1-4 classes per year	9	18.75	4	8.33
5 or more classes per year	20	41.67	15	31.25
No extension classes offered	18	37.50	17	35.42
Total	48	100	48	100

Type Of Delivery Systems

The categories of delivery systems used in LIS distance education programs are broadcast technologies, *Audio/Video* technologies and the *Internet*. *Broadcast* technologies include the use of cable television, satellite broadcasts, television courses, interactive television and closed circuit television. *Audio/Video* technologies include audio/video conferencing, audio/video tapes, compressed video, interactive video, one-way audio, one-

way video/two-way audio, two-way audio, and two-way audio/video. The *Internet* includes the use of the World Wide Web, computer networking and computer conferencing.

The findings show that in 1989 a total of eight schools used technology. Five (10.42%) of these schools used *Audio/Video* technology only, two (4.16%) schools used *Broadcast* only and one (2.08%) school used a combination of the two technologies.

The findings from the 1998 catalogs show that a total of 36 schools used technology. Of these schools, 8 (16.67%) used *Audio/Video* technology only, 8 (16.67%) used the *Internet* only and 20 (41.66%) of schools used a combination of technologies.

Of the twenty schools that used a combination of technology, 18 (37.5%) of those schools used the *Internet* and *Audio/Video*, and 2 (4.16%) of those schools offered classes by *Broadcast*, *Audio/Video* and the *Internet* (see Table 11).

Table 11. – Type of technology being used for the delivery of distance education classes (N=48)

Technology	**1989 Catalog**		**1998 Catalog**	
	f	%	*f*	%
Broadcast only	2	4.16	0	0
Audio/Video only	5	10.42	8	16.67
Internet only	0	0	8	16.67
Audio/Video & Broadcast	1	2.08	0	0
Audio/Video, Broadcast & Internet	0	0	2	4.16
Audio/Video & Internet	0	0	18	37.50
No Distance Education	40	83.34	12	25.00
Total	48	100	48	100

Figure 4 clearly shows the most dominant delivery systems currently being used are Audio/Video technologies and the Internet. The use of Broadcast technology, as a delivery system decreased from 1989 to 1998.

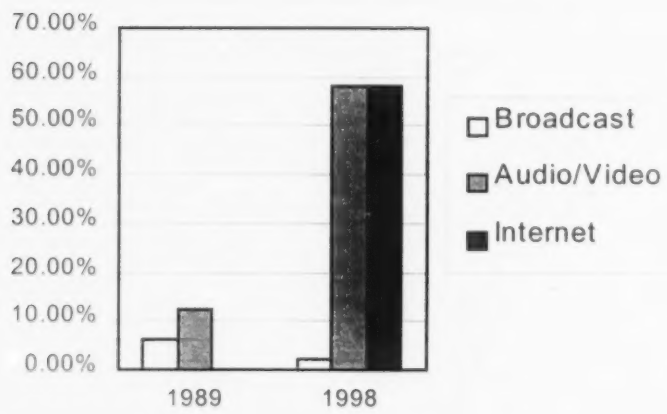

Fig. 4. The percentage of delivery systems used, 1989 compared to 1998.* (N=48)

* Percentages do not add up to 100% because of multiple entries.

CHAPTER 5

SUMMARY AND CONCLUSION

Again, as stated in Chapter I, the purpose of this study was to determine the trends in, and usage of, distance education in the United States within the library science field for a ten year period. Within that stated purpose, four specific objectives were established as shown in the following paragraphs. Based on the findings from the data presented in Chapter 4, this study accomplished its purpose and objectives.

Objective 1, quantity and subject of research. The professional journals identified the quantity of research being published and the subject of that research. From the data analyzed there appears to be a significant lack of research articles being published on distance education within library programs. Of the 128 articles used in this study, only 14% were dedicated to research. This low percentage parallels similar findings by Daniel Barron (1990)[42] and Anita Coleman (1996).[43] Findings reveal that 44% of the research articles dealt with distance education students. Except for one, all research articles (94%) were authored by faculty of a university, with survey (61%) being the primary methodology of research.

Objective 2, major topics contained in journals. The content analysis of published articles found that 87% of the articles dealt with four non-research topics, as follows. The majority of articles (27%) were concerned with *Distance education programs* at a specific university and discussed such issues as financing, implementing technology, changes in teaching methodologies, and course offerings. The percentages of the other three non-research categories are distributed fairly evenly: Technological *development* (20%), *Support*

services (18%), and *Field of distance education* (17%). Articles that discuss *Technological development* examine types of delivery systems, and other technology to support distance students and faculty. Articles categorized under *Support services* pertain to the support, or lack thereof, to distance education students, and cover issues such as document delivery, academic advisement, and library resources and services available to distance students. Articles placed under the *Field of distance education* emphasized distance education in general, and included the history, definitions, opinions and future development of the field.

A significant and unanticipated finding from the analysis was the percentage of articles published from 1996 through 1998. More than half (56%) of all articles studied were published within these three years. Other findings show that 78% of the articles that discuss technology examine the Internet and other computer-based technologies.

Objective 3, implementation or increase of distance education. The findings show a definite increase in the use of distance education. The data from the 1989 catalogs showed that 16.67% of library programs used distance education. By 1998 this figure more than tripled, such that, of the forty-eight accredited programs selected for this study, 75% offered distance education. A most significant finding from this study showed that 50% of the 1998 accredited library programs offered five or more distance education classes per academic year (in 1989 only one library program offered five or more classes per academic year). Of schools offering five or more classes, 18.75% of the programs offered the ability to obtain a MLS degree totally through distance education. These figures demonstrate the effort accredited library programs in the United States have taken to accommodate the non-traditional learner.

Objective 4, the technology being used for delivery of distance education. Findings from this study identified the rapid growth of the Internet and other computer based technologies to deliver classes. The two most identifiable technologies being used in 1989 were broadcast systems and audio/video technologies. By 1998 more than half (58.33%) of the accredited library programs implemented an Internet-based technology to deliver classes. Of the thirty-six programs offering distance education 50% used both the Internet and audio/video technologies.

From the results of this study three major conclusions can be drawn.

First, the results show substantial increases in the use of distance education by ALA accredited library programs in the United States. This includes a growing number of library schools offering the entire MLS degree through distance education.

Second, there is a growing trend in the use of the Internet and other computer-based technologies to deliver classes. Even though audio/video technology (as defined in this study) has been an established standard since the 1980s, the data from this study showed that more than half of the library programs used the Internet to deliver classes. Future research needs to be conducted to see if the Internet surpasses the use of audio/video technology.

Third, there is a definite lack of research articles published on distance education in the major library journals. Other researchers in the library science field addressed this issue. The results of this study at least proved that "low utilization of distance education programs" is not a reason for lack of research. Since three-fourths of the ALA accredited library programs offer distance education, where is the research from these schools? Could research have been conducted but not published, or, not published in the major library journals? Is this the norm compared to other research topics in library science? Could the rapid growth in

technology have an impact on the amount of research being published? These questions will remain unanswered until further research is conducted.

APPENDICES

Appendix A

List of ALA Accredited Library Programs in the United States Used In This Study.

1. University of Alabama
2. University of Arizona
3. San Jose State University
4. University of California, Los Angeles
5. Southern Connecticut State University
6. Catholic University of America
7. Florida State University
8. University of South Florida
9. Clark Atlanta University
10. University of Hawaii
11. Dominican University
12. University of Illinois at Urbana-Champaign
13. Indiana University
14. University of Iowa
15. Emporia State University
16. University of Kentucky
17. Louisiana State University
18. University of Maryland
19. Simmons College
20. University of Michigan
21. Wayne State University
22. University of Southern Mississippi
23. University of Missouri-Columbia
24. Rutgers University
25. Long Island University
26. Pratt Institute
27. Queens College
28. St. John's University
29. Syracuse University
30. University at Albany
31. University at Buffalo
32. North Carolina Central University
33. University of North Carolina at Chapel Hill
34. University of North Carolina at Greensboro
35. Kent State University
36. University of Oklahoma
37. Clarion University of Pennsylvania
38. Drexel University
39. University of Pittsburgh
40. University of Rhode Island
41. University of South Carolina
42. University of Tennessee
43. Texas Woman's University
44. University of North Texas
45. University of Texas at Austin
46. University of Washington
47. University of Wisconsin-Madison
48. University of Wisconsin-Milwauke

Appendix B

CODING SHEET A

Article Title	
Journal/Book	
Volume	
Issue/Date	
Author	

ARTICLE TYPE

____ **Research**	____ **Non-Research**

1a) Author Affiliation

____ Faculty
____ Librarian
____ Media/Communications
____ Staff editor/writer
____ Other

1b) Publication Year

____1989
____1990
____1991
____1992
____1993
____1994
____1995
____1996
____1997
____1998

1c) Research Methodology

____Bibliometrics
____Case study
____Content analysis
____Delphi
____Evaluation
____Historic
____Interview
____Observation
____Operations
____Survey/Questionnaire
____Other

2a) Author Affiliation

____ Faculty
____ Librarian
____ Media/Communications
____ Staff editor/writer
____ Other

2b) Publication Year

____1989
____1990
____1991
____1992
____1993
____1994
____1995
____1996
____1997
____1998

2c) Non-research topics

Distance Education Programs
____Course offerings/listings
____Development/implementation
____Description
____Other

The Field
____History & definitions
____Overview & issues
____Opinions on distance education
____Present status & future development
____Other

CODING SHEET A
ARTICLE TYPE (CONTINUED)

Research	Non-Research

1d) Research topic

Distance education students
____Attitudes & perceptions
____Characteristics
____Enrollment patterns
____Learning performances
____Needs assessment
____Other

Distance education programs
____University offerings
____Other

Faculty
____Attitudes & perceptions
____Other

Services
____Library resources & services
____Other

Technology
____Evaluation
____Usage
____Other

1e) Technology identified

Broadcast technology
____Cable TV network
____Interactive television
____Satellite/ live broadcast
____Telecourses/ taped programs
____Closed circuit television

Audio/Video Technologies
____Audio/Video conferencing
____Audio tape/Videotape
____Compressed video
____Interactive video
____One-way audio
____One-way video/two-way audio
____Two-way audio
____Two-way video/audio (interactive)

2c) Non-research topic (continued)

Technological Development
____Instructional delivery systems
____Resources & services systems
____Other

Learning/Teaching methodologies
____Theory, methods & processes
____Personal experience
____Learner characteristics
____Other

Support Services
____Library services
____Other

Staff Development
____Faculty staff development
____Support staff development
____Other

2e) Technology identified

Broadcast technology
____Cable TV network
____Interactive television
____Satellite/ live broadcast
____Telecourses/ taped programs
____Closed circuit television

Audio/Video Technologies
____Audio/Video conferencing
____Audio tape/Videotape
____Compressed video
____Interactive video
____One-way audio
____One-way video/two-way audio
____Two-way audio

Internet & computer-based technology
____Internet/WWW
____Computer conferencing
____Computer networking

Internet & computer-based technology

____ Internet/WWW

____ Computer conferencing

____ Computer networking

Appendix C

CODING SHEET B

Library Program	

1) Catalog year

____ 1989

____ 1998

2) Degree(s) offered

____ Bachelors
____ Certificate---advanced
____ Certificate---specialization
____ Masters Library Science
____ MLS---specialization
____ MLS---joint Masters degree
____ PHD
____ Other

3) Amount & type of classes offered

____ Complete program—distance education

____ Complete program—extension

____ 1-4 extension courses per academic year

____ 1-4 distance education courses per academic year

____ 5+ extension courses per academic year

____ 5+ distance education courses per academic year

____ None offered

____ Information not available

4) Types of delivery systems

Broadcast Technology

____ Cable TV network
____ Interactive television
____ Satellite/ live broadcast
____ Telecourses/ taped programs
____ Closed circuit television

Audio/Video Technologies

____ Audio/Video conferencing
____ Audio tape/Videotape
____ Compressed video
____ Interactive video
____ One-way audio
____ One-way video/two-way audio
____ Two-way audio
____ Two-way video/audio (interactive)

Internet & computer-based technology

____ Internet/WWW (online-courses)
____ Computer conferencing
____ Computer networking

ENDNOTES

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